

Application No.: 10/520,816

REMARKS

I. Introduction

As a preliminary matter, it is noted that the Office Action mailed June 14, 2006 contained an Information Disclosure form PTO-1449 filed January 7, 2005 which was signed and dated by the examiner. However, the examiner omitted initialing the citations of two documents listed in the bottom section titled "OTHER ART." Specifically, M. FAYOLLE, et al. "Proceedings of the 2002 International Interconnect Technology Conference", and HIGASHI, et al. "Proceedings of the 2002 International Interconnect Technology Conference" were not initialed.

Thus, the Applicants request that the examiner amend said Information Disclosure form PTO-1449 to indicate that all of the documents have been considered by the examiner and made of record. Please provide a copy of the amended form to the Applicants with the next Office Action.

In response to the pending Office Action, Applicants have amended claims 1, 2, 6, 7, 11, and 16. These amendments are supported, for example, by at least by FIG 1, FIG 5, paragraphs [0079] - [0108], and paragraphs [0124] - [0141].

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art.

II. Claims 1-15

With regard to the present invention, amended independent claims 1, 6, and 11 recite that "a bottom of the trench is located in the middle portion of the low dielectric constant film." Anticipation under 35 U.S.C. § 102(e) requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F. 2d 760, 218 USPQ 781 (Fed. Cir. 1983).

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At a minimum, the cited prior art does not disclose a bottom of a trench located in the middle portion of the low dielectric constant film. For example, Steiner (U.S. Patent Publication No. 2003/0001273) figure 6 merely discloses a trench 82 with a bottom which is located below the entire low dielectric constant film 42. Thus, Steiner does not disclose a bottom of a trench located in the middle portion of the low dielectric constant film.

As described in Applicants' specification, for example, on page 6, lines 6-12; page 7, line 19 – page 8, line 5; and page 9, lines 6-13 of Applicants' specification, such a configuration can make it possible to suppress nitrogen entry into the low dielectric constant film and diffusion of amine or the like into the resist used to form trench thereby preventing resist poisoning, etc.. Steiner is silent as to such effects, let alone suggest the claimed structure enabling such effects.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as independent claims 1, 6, and 11 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims 2-5, 7-10, and 12-15 are patentable based on their own merits by adding novel and non-obvious features to the combination.

III. Claims 16-20

With regard to the present invention, amended independent claim 16 recites “a low density insulating film having a film density of 1.3 g/cm³ or lower and formed over the low dielectric constant film” and “an upper surface of the interconnect and an upper surface of the low density insulating film are on the same level.” Anticipation under 35 U.S.C. § 102(e)

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requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983).

At a minimum, the cited prior art does not disclose an upper surface of the interconnect and an upper surface of the low density insulating film are on the same level. For example, Huang (U.S. Patent Publication No. 2005/0098896) paragraph [0024] merely discloses "the first low-dielectric constant material sub-layer 106 may comprise a density of about 0.89 to 1.2." Huang figure 1 displays said sub-layer 106 as a bottom sub-layer in a series of layered low-dielectric constant materials. Thus, Huang does not disclose an upper surface of the interconnect and an upper surface of the low density insulating film on the same layer, nor the effects that can be made possible from the present invention described in Applicants' specification.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as independent claims 16 is patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims 17-20 are patentable based on their own merits by adding novel and non-obvious features to the combination.

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CONCLUSIONS

For at least the above reasons, all pending claims 1-20 are in condition for allowance.

As discussed above, the Applicants request that the examiner amend said Information Disclosure form PTO-1449 to indicate that all of the documents have been reviewed by the examiner. Please provide a copy of the amended form to the Applicants with the next Office Action.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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